

Accelerator Operations

1999 Operations and Beam Delivery	202
2000 Operations and Beam Delivery	202
Proton Radiography and Other Operations	203
Accelerator Maintenance Request and Tracking System Improvements	204
2001 Run Cycle Planning	204

User Program

Supporting Student Research	204
Experiment Reports	205
The LANSCE User Office	205
The Face of the Users	205
The Voice of the Users	206
LANSCE User Group Meeting	207

Accelerator Operations and User Program

Accelerator Operations

1999 Operations and Beam Delivery

The original goal for 1999 was to operate the User Facility for six months. Specifically, 3,240 hours to the Lujan Center, 747 hours to WNR, 440 hours to PRAD, and 480 hours for PSR development. Once final budget allocations for FY99 were known in January 1999, it became obvious that this goal could not be achieved. Given the magnitude of the shortfall, the only recourse seemed to be to curtail operation of one of the experimental areas. Planning for reduction of WNR operations was in progress when all beam operation was interrupted by a safety stand down ordered by LANSCE management on February 5, 1999, in response to several "near misses."

Following the stand down, linear accelerator operations restarted with beam delivery to PRAD experiments in Area C on May 27 and to WNR on June 18. Although the plan called for Lujan Center restart at the end of July, this was not achieved because both DOE and LANSCE discovered inadequacies in the Basis for Interim Operation (BIO) that had authorized operation in 1998. This required extensive modifications to the BIO, to include the following:

- increase beam current to the Lujan Center target from 100 μ A to 150 μ A;
- increase fraction of spallation target released during design-basis accident from 15% to 100%;
- use 95% weather rather than 50% weather to calculate dose consequences;
- correct dose conversion factors for various isotopes;
- include building heating, ventilation, and air conditioning (HVAC) system in accident analysis and add controls and monitoring for this system;
- include HVAC high-efficiency particulate air filter in loss-of-coolant accident (LOCA) analysis and its subsequent designation as safety significant for on-site worker protection;
- designate beam spill monitors as safety significant;
- consider possible rupture of FP windows in the event of hydrogen detonation;
- consider LOCA in the reflector water system in the accident analysis;
- consider target-crypt hydrogen fire in accident analysis; and
- perform additional analysis for earthquake and plane crash accidents.

On October 13, a contamination event associated with the Lujan Center target required decontamination of ER-1 and the complete cleaning (snaking, flushing, and inspecting) of over 1,900 linear feet of radioactive

liquid waste drains beneath the Lujan Center, WNR, and the PSR (Fig. 1). In spite of their operational complexity, these tasks were completed in less than six months and in full compliance with a complex web of environmental laws. Concurrently, LANSCE personnel developed over 50 new procedures (and revised many more) for operation of the Lujan spallation target to implement the required operational formality.



↑ Fig. 1. Personnel working on vacuuming the radioactive liquid waste drain had to wear special protective equipment, including respirators.

The delay in restarting the Lujan Center allowed more time devoted to researching the PSR instability—to the great advantage of the SPSS Enhancement Project. The delay also allowed the installation of four much-improved mercury beam shutters at the Lujan Center without exposing the installation crews to levels of radiation that would have been seen with an extensively irradiated spallation target.

2000 Operations and Beam Delivery

LANSCE's stated goal for 2000 was to operate the User Facility for nine months with seven months of beam delivery for the user programs. Specifically, we originally planned to deliver 2,995 hours to the Lujan Center and WNR, 346 hours to PRAD, and 192 hours for PSR development. An interruption of beam delivery for three months was also scheduled to install various upgrades and to perform maintenance on the facility. Following the December holiday outage, maintenance was performed during the first two weeks of January 2000, followed by accelerator startup in a low-power mode. Beam was delivered as scheduled for Area C users and the UCN experiment in Line B. An extensive list of additional requirements to obtain DOE authorization for beam delivery delayed operation of both the Lujan Center and WNR until May.

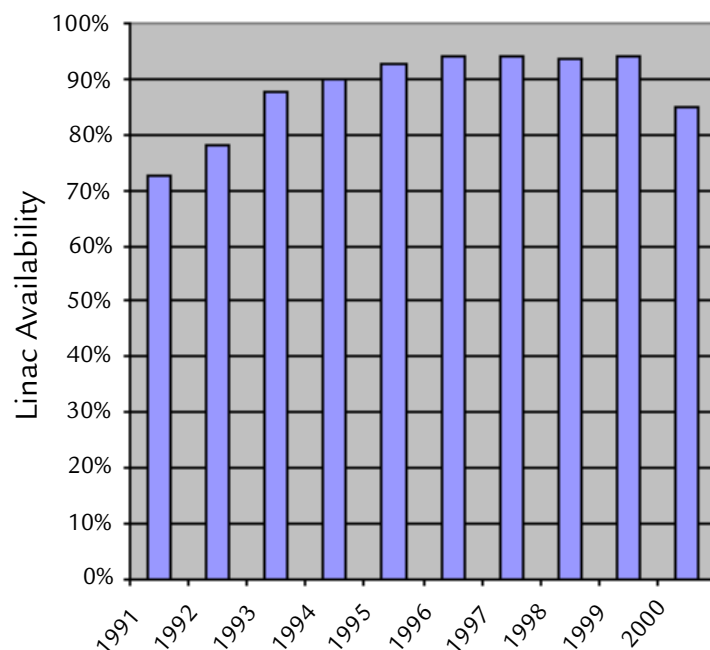
During early May, the Cerro Grande wildfire spread into Los Alamos and caused evacuation of the area and a full shutdown of LANSCE facilities for two weeks (see also page 214). Following the fire, LANSCE facilities were rapidly restored to operation, and accelerator operation resumed on June 8. Beam delivery to WNR resumed on June 16 and to Area C and Line B on June 29.

The DOE authorization to deliver beam to the Lujan Center target was obtained on June 17, and first tuning beam was delivered that same day. Research activities at the Lujan Center resumed on July 11-12 when three FPs were opened. On August 23, an average beam current of 100 μA was achieved and sustained to the Lujan Center target. The late start of beam delivery to the Lujan Center and the neutron-scattering program resulted in modifications of the original schedule and shifted the planned outage from April-June 2000 to January 2001. The 2000 operations schedule was extended to the beginning of the Laboratory's scheduled holiday closure in late December.

Table 1 shows the scheduled, delivered, and available beam statistics for calendar years 1999 and 2000. Fig. 2 shows linac availability by calendar year.

Proton Radiography and Other Operations

Since 1997, LANSCE has provided proton beams for 78 explosively driven experiments (13 in 1999, 26 in 2000) in Area C without a single failure of the proton beam to arrive at the test station coincident with the dynamic event. The shots delivered in 2000 included the one that resulted in an unprecedented sixteen-picture sequence for the Billi G 4L experiment (see related technical highlight on page 138.) The team was able to use the accelerator's unique capability for variable time intervals between



↑ Fig. 2. Linac availability by calendar year.

beam pulses to tailor the beam-pulse timing sequence for optimum data return. Never before has a chain of 16 pulses of accelerator beam been synchronized to provide a radiographic “movie” of a hydrodynamic test. In December 2000, the PRAD team partnered with a commercial enterprise to use this unique tool to study the flow of water in the cooling passages of an automobile engine by using neutral-density tungsten-loaded beads.

The Accelerator Operations Team gained considerable experience with the “slow-kick” mode of operation that involves switching the beam as rapidly as possible between Line X (PRAD and UCN) and Line D (Lujan Center and WNR). Operations personnel were able to reduce the switchover times to less than 30 minutes in a reliable fashion. This capability allows for a more complex scheduling of different portions of the User Facility.

Beam was also delivered to WNR Target 2 (the “Blue Room”) in support of neutron resonance spectroscopy activities. These experiments involved delivery of a single pulse of beam stored in the PSR to the target assembly in the Blue Room. Improvements to the beam-tuning techniques for the ring and beam transport allowed these experiments to

Table 1. Beam Delivery During 1999-2000

Facility	Scheduled Beam (hours)		Delivered Beam (hours)		Available Beam (%)	
	1999	2000	1999	2000	1999	2000
WNR Target 2	662	346	590	307	89%	89%
WNR Target 4	2504	2541	2005	2024	80%	80%
Lujan Center	312	2340	240	1749	77%	75%
PRAD (Area C)	629	897	538	806	86%	90%
PSR (Accelerator development)	480	312	547	218		70%

The number of scheduled hours does not include hours that could not be delivered due to events such as the safety stand down (1999), and the Cerro Grande Fire and readiness assessment requirements (2000) that precluded beam delivery. Using rescheduled hours, the overall beam availability at the Lujan Center (a measure of the reliability of the accelerator and target equipment) was approximately 77% in 1999 and 75% in 2000.

Accelerator Operations and User Program

receive a consistently improved charge per pulse for each dynamic event. This capability is also used by the SNS project to conduct shock tests for proposed target materials.

Accelerator Maintenance Request and Tracking System Improvements

The Accelerator Operations Group has introduced a number of new features to its Web-based database in order to streamline user interface and improve usability for requesting and recording maintenance on accelerator and beam delivery systems. First commissioned in 1997, the upgraded LANSCE Accelerator Maintenance Request and Tracking System now provides a convenient way for accelerator operators and others to notify staff and technicians responsible for system maintenance of needed equipment repairs and for maintenance personnel to record progress on those repairs. Managers can use the information the database provides to understand their maintenance programs and to more efficiently prioritize the use of operating funds.

The Accelerator Maintenance Request and Tracking System now allows users to

- submit requests for maintenance of an accelerator system or device, and either (1) assign a priority to the request, (2) request that the maintenance be completed by a specific date, or (3) request that maintenance be performed on a regular schedule;
- respond to maintenance requests with information about the work performed;
- submit reports of maintenance performed without a request;
- redirect maintenance requests sent to the wrong maintenance team;
- defer a request and provide the reason;
- update the status of pending maintenance requests;
- search and download maintenance records that meet flexible search criteria; and
- utilize simplified forms for "power users."

2001 Run Cycle Planning

The 2001 outage was planned in detail during the last quarter of 2000 to coordinate eight major tasks and to level personnel resources across those activities to ensure a timely completion of the outage. The major tasks included

- IPF shield-wall construction,
- IPF modifications to the transition region and beam-line installation,
- cooling tower connection and commissioning,
- preparation and submission of a safety survey as an interim authorization basis,

- nuclear facility operations,
- accelerator maintenance,
- facility maintenance, and
- accelerator turn-on.

Early in the planning process it was determined that insufficient resources were available to install the new H⁺ ion source equipment with an acceptable risk to the proposed date for resumption of User Facility operations. As a result, installation was deferred. The scope of activities was adjusted to allow the work to be accomplished in a five-month outage (January–May 2001) including 24 calendar days of contingency. An outage manager was appointed, and a formal management and change control process was established.

User Program

The major portion of funding for LANSCE is provided by the DOE/DP, which uses LANSCE in support of its stockpile stewardship mission to ensure that U.S. nuclear weapons remain safe, secure, and reliable without nuclear testing. The obvious synergy between the DP uses of LANSCE and the areas of basic research that have traditionally used reactor or spallation neutron sources, particularly in the area of condensed-matter science, has led to an alliance between DP and the DOE/BES to support and use LANSCE. BES provides funding for a National User Program at the Lujan Center that attracts scientists in various disciplines who use neutron scattering in support of their research. The synergy between DP and BES allows scientists from different institutions to perform defense, basic, and industrial research at LANSCE.

Experiments at the Lujan Center and WNR are selected on the basis of proposals that are peer reviewed by the appropriate subcommittee of our Program Advisory Committee (PAC). By charter, members of the PAC are selected by LANSCE management for a three-year term on the basis of recommendations by members of the LANSCE User Group (LUG) through the LUG Executive Committee and Laboratory management.

Experiments at the Lujan Center or WNR that involve either results that are publishable in the open literature or support the DOE's stockpile stewardship mission receive beam time from LANSCE at no cost to the user. Beam time for proprietary work can be purchased by a special user agreement under DOE's full-cost recovery rules.

Supporting Student Research

LANSCE recognizes that it has a key role to play in science education, not only of the graduate students who

use the facility as part of their higher education, but also of younger students. Students and postdoctoral fellows learn from and contribute to the research at LANSCE in various ways. Nine theses based in whole or in part on research conducted at LANSCE facilities were completed during 1999-2000. A list of these can be found in the publications section on page 259.

LANSCE takes great pride in serving as a training ground for undergraduate and graduate students in the use of neutron-scattering techniques. Many students spend summer months as LANL employees working at the Lujan Center and WNR, usually at the recommendation of their thesis advisor. Students are paid a salary during their tenure. More information on student employment programs can be obtained from the Laboratory's Human Resources Division web site at www.hr.lanl.gov/Students/.

An exciting new program called STONE (Student Travel Opportunities for Neutron Experiments), aimed at broadening the user community, increasing access to instruments to students and faculty, and providing training to new student users in neutron scattering techniques, received funding for three years beginning in Fall 2000. The STONE program is the brainchild of the HIPPO Spectrometer Development Team: Principal Investigator Dr. Rudy Wenk, University of California at Berkeley, and Project Manager Kristin Bennett and Technical Director Bob Von Dreele of the Lujan Center.

Through LANL's University of California Directed Research and Development Office (UCDRD) and LANSCE, funds to help offset travel expenses have been made available to students coming to the facility to conduct neutron-scattering experiments. These funds are available to all University of California or New Mexico university students who have been allocated beam time as part of an approved experimental team. In addition to funds, LANSCE staff members provide students with training on the use of the spectrometers and assist in experimental setup and data analysis. This high level of technical support allows professors the flexibility to bring, or send, students to conduct experiments without a high impact on their research budget.

Experiment Reports

Experiment reports are required for all experiments performed at the Lujan Center or WNR. Experiment Reports from 1998-2000 are included on the CD in the inside back cover of this report. Current reports can be obtained by contacting the LANSCE User Office at 505-665-1010 or lansce_users@lanl.gov.

The LANSCE User Office

The LANSCE User Office has the central role for administering the user program and for user reception. User Office staff (Fig. 3) spend the majority of their time

- assisting users with their visit, including travel and lodging arrangements;
- administering the proposal, review, and scheduling processes;
- improving processes for user access, orientation, training, and services;
- communicating beam-schedule information to users;
- supporting conferences and workshops;
- supporting the User Group and other committees integral to the user program;
- organizing and supporting the Annual User Meeting;
- collecting and reporting statistical information about the facility and users;
- assessing and reporting user satisfaction;
- arranging travel support and funding support for students;
- coordinating user/visitor communications;
- reception for all visitors and users to the facility; and
- arranging facility tours.



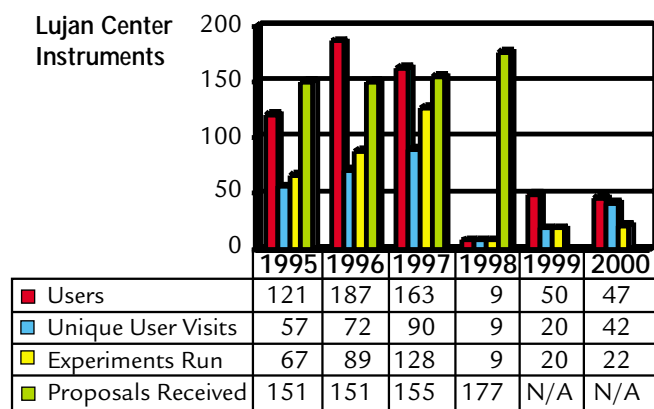
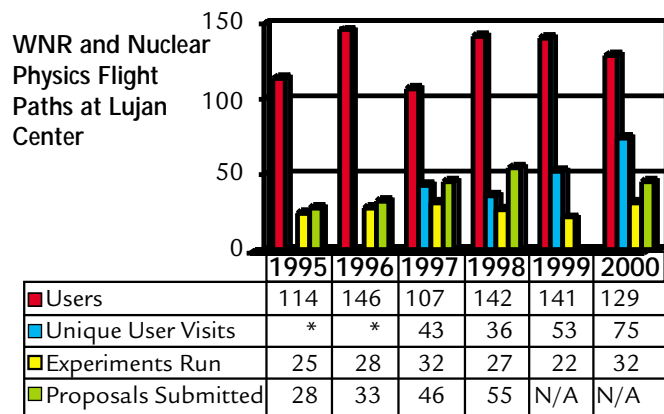
↑ **Fig. 3.** The User Office has seen many changes over the last two years. The current User Office Team consists of Sandy Booth, who administers the proposal process, maintains the complex database and generates statistical reports, and maintains the publications database and user information web pages; and Evan Sanchez, who supports the LUG Executive Committee and PAC, coordinates all aspects of user visits, and oversees the Visitor Center. Together, this small team also supports related conferences/workshops, maintains public areas, collects tourist information, and performs a myriad of other tasks for LANSCE and its users and visitors. (The User Coordinator position is currently vacant.)

The Face of the Users

Due to the limited user facility operations in 1999-2000, there was no formal call for proposals in either year. Instead, experiments were scheduled from the backlog of proposals that had been approved in 1998 in

Accelerator Operations and User Program

anticipation of the start of that run cycle. The user program operated in a “friendly user” mode—scheduling users that had extensive neutron scattering experience, were not adversely affected by varying beam conditions, and/or could be run as “mail-in” samples under the direction of the instrument scientists.



↑ Fig. 4. Calendar year user and proposal statistics. Users include all those on the experimental team but not internal support. “Unique user visits” counts each user only once, regardless of the number of visits/experiments conducted during the run cycle. There was no formal call for proposals in 1999 or 2000.

The Voice of the Users

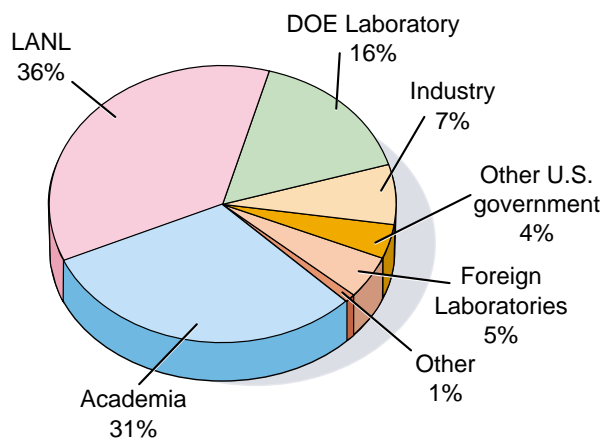
Established in 1996, the LANSCE User Group (LUG) provides users (Fig. 5) and potential users the opportunity to influence the way in which the facility is managed and improved. Unique to DOE user facilities, biennial renewal of membership is required to maintain active status in the LUG to ensure we hear primarily from active users. Prior to membership renewal in November 2000, the membership included 394 individuals from across the diverse spectrum of facility users (Fig. 6).

The User Group is represented by an 11-member Executive Committee (ExecCom) (Figs. 7 and 8). ExecCom membership is structured to represent the principal activities at LANSCE: neutron scattering, defense-related research, and nuclear physics and technology, plus one graduate student or postdoctoral fellow in any of these disciplines. The ExecCom holds monthly conference calls and meets at LANSCE on a quarterly basis. They have been instrumental in working on a variety of issues, including developing benchmarking data, providing input on the Spectrometer Development Project, funding and scheduling issues, and organizing the 2000 User Meeting.



↑ Fig. 5. Users in the WNR Blue Room determine temperatures and velocity distributions in shocked materials by measuring the Doppler broadening of low-energy neutron resonances.

LANSCE User Group Membership



↑ Fig. 6. LUG distribution by affiliation as of November 2000.



↑ **Fig. 7.** The 2000 members of the LANSCE User Group Executive Committee. Standing left to right: Steve Grimes (Ohio University), Tonya Kuhl (University of California at Santa Barbara), Chris Durning, Chair (Columbia University), Ward Beyermann, Vice Chair (University of California at Riverside), Mary Hockaday (Los Alamos National Laboratory). Seated left to right: David Londono (DuPont Central Research and Development) and Mike Manley (Los Alamos National Laboratory). Not present for photo: Dave Bowman (Los Alamos National Laboratory), Gene Farnum (Los Alamos National Laboratory), Brent Heuser (University of Illinois) and Frank Dietrich, Past Chair, Ex-Officio (Lawrence Livermore National Laboratory).



↑ **Fig. 8.** The 1999 members of the LANSCE User Group Executive Committee. Left to right: Tonya Kuhl (University of California at Santa Barbara), John Sarracino (Los Alamos National Laboratory), Frank Dietrich, Chair (Lawrence Livermore National Laboratory), Timothy Kelley (Los Alamos National Laboratory), Chris Durning, Vice Chair (Columbia University), David Dunand (Northwestern University), and June Matthews (Massachusetts Institute of Technology). Not present for photo: Collin Broholm, Past Chair, Ex-Officio (John Hopkins University), Gene Farnum (Los Alamos National Laboratory), Steven Grimes (Ohio University) and Eugene Normand (The Boeing Company).

LANSCE User Group Meeting

User meetings, organized by the LUG ExecCom, bring together current and potential users of LANSCE to share recent scientific discoveries and to discuss instrumentation upgrades and other changes that could enhance scientific output. Student participation is encouraged through travel support, reduced registration fees, and student poster prizes.

The Fourth LANSCE User Group Meeting was held in Santa Fe, January 23-25, 2000, with about 100 attendees from academia, DOE laboratories, foreign laboratories, industry, and other government agencies. The meeting opened with two workshop: (1) Neutron Scattering Probes of Long-Length Scale Structure: Small-Angle Neutron Scattering and Neutron Reflectometry as Applied to Magnetic Structure, and (2) Complex Systems and Neutron Techniques: Opportunities for the Future. On the second day, speakers presented topics that included an overview of major funding organizations for LANSCE and overviews of stockpile stewardship, studies involving complex systems, nuclear science, and PRAD. This followed with discussions of neutron-scattering efforts in the U.S., including the SNS Project, new initiatives of the Neutron Scattering Society of America (NSSA), the overall LUG program, and the Lujan Center. The day ended with updates on the design and construction of the new spectrometers to be constructed at the Lujan Center.

A LUG business meeting followed with discussions about NSSA initiatives that would "homogenize" an organization of scientists and engineers with a common interest in neutron-scattering research. A poster session and reception followed, with attendees casting their votes for best student posters.

2000 User Meeting Student Poster Winners

Peter Bogdanoff, California Institute of Technology
Vibrational Entropies of Disordered Cu-Au Alloys by Inelastic Neutron Scattering

Michael Manley, Los Alamos National Laboratory
Photon Densities of States of γ -Cerium and δ -Cerium Measured by Time-of-Flight Inelastic Neutron Scattering

The final day was comprised of plenary talks, followed by more focused, specialized sessions held in parallel. The 17th Annual Rosen Prize was presented to Raj Vaidyanathan, Massachusetts Institute of Technology, for his work on the mechanical properties of shape-memory materials and composites. Vaidyanathan (Fig. 9) was the first recipient in materials science to receive this prestigious award since the Rosen Prize was opened to all LANSCE users in 1997.

→ **Fig. 9.** Raj Vaidyanathan, Massachusetts Institute of Technology, recipient of the 17th Louis Rosen Prize. This Prize was established by the LAMPF Users Group, Inc., in 1983 to recognize the outstanding contributions made by Louis Rosen in the development and leadership of what is now LANSCE. The LUG awards the Rosen Prize for an outstanding thesis based on experimental or theoretical research performed at LANSCE each year.



Accelerator Operations and User Program

Fourth LANSCE User Group Meeting



↑ Peter Bogdanoff (California Institute of Technology) receives a student poster prize from ExecCom member Tonya Kuhl (University of California at Santa Barbara) for his poster "Vibrational Entropies of Disordered Cu-Au Alloys by Inelastic Neutron Scattering."



↑ David Crandall, DOE Associate Deputy Assistant Secretary of Defense Programs, discusses stockpile stewardship issues and important advances made at LANSCE over the past year.



↑ Roger Pynn presents Greg Smith (Lujan Center) with the first Director's Award for Scientific Excellence for his achievements using neutron reflectometry to study biological materials and soft-condensed matter to further the understanding of the materials' surface structures at the molecular level.



↑ Roger Pynn shares a light moment with Louis Rosen (former LAMPF Director) and his wife Mary at the banquet reception.



↑ Peter Bogdanoff provides technical details of his prize-winning poster during the poster session and reception to other student attendees.



↑ Francis Hellman (University of California at San Diego) speaks on "Amorphous $TbFe_2$: coherent anisotropy induced ferromagnetism" during the workshop, Neutron Scattering Probes of Long-Length Scale Structure: Small-Angle Neutron Scattering and Neutron Reflectometry as Applied to Magnetic Structure.



↑ Invited speaker, Ka Yee Lee (University of Chicago) and Tonya Kuhl (University of California at Santa Barbara) take time out for a quick pose during the opening reception.

During the meeting banquet, LANSCE Director Roger Pynn presented the first Director's Award for Scientific Excellence to Greg Smith of the Lujan Center. Smith was selected by the LUG Executive Committee for his scientific achievements using neutron reflectometry to study biological materials and soft-condensed matter to further the understanding of the materials' surface structures at the molecular level. Pynn presented Smith with a plaque and a \$2,000 cash prize for demonstrated scientific excellence and leadership. Outgoing 1999 LUG Executive Committee members were presented with certificates of appreciation for their hard work and dedication to the user community at large.

Guest speaker, Dr. Louis Rosen, ended the evening's festivities with an historical account of the "mini crises" that affected LANL and those that currently affect LANSCE. He ended by elaborating on the challenges that user facilities like LANSCE face: "We will be called upon to justify our scientific endeavors...[and] we must maintain Los Alamos as a crossroads to science. User interaction enables international confidence building."



Comments from the Chair

*Frank Dietrich, Lawrence Livermore National Laboratory
1999 LANSCE User Group Executive Committee Chair*

It was both a pleasure and a privilege to serve the LANSCE user community as Chair of the LANSCE User Group (LUG) Executive Committee during 1999.

LANSCE is a truly unique institution because of the wide range of its programs and the various facilities for carrying them out. These programs carry out first-rate research in diverse fields ranging from fundamental physics to industrial applications and defense science. It is a particular challenge to the Executive Committee to represent users with backgrounds and interests in nearly all the scientific disciplines, including condensed matter physics, nuclear physics, and the physics of fundamental interactions, as well as many fields of engineering. The makeup of the Executive Committee reflects this diversity. It was gratifying to see the members of the 1999 Executive Committee working together very effectively to understand the issues affecting users of all of LANSCE's facilities and to make appropriate recommendations to LANSCE management.

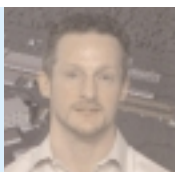
One of the most important functions of the Executive Committee is to plan the annual meeting of the LUG. The annual meeting provides an opportunity for the users, Laboratory management, and funding agencies to share information and to review technical progress since the previous meeting. It also provides a snapshot of the state of the LANSCE facility. This meeting, held in early 2000, featured a number of recent successes in the LANSCE program, including proton radiography and the measurement of cross sections important for defense programs by the GEANIE (Germanium

Array for Neutron-Induced Excitations) collaboration at the Weapons Neutron Research (WNR) facility. These accomplishments, among many others, clearly showed the ability of LANSCE to deliver first-rate science and technology. The major downside during the year, of course, was the lack of beam in the Lujan Center and consequent lack of productivity in this vitally important part of the LANSCE facility.

Nevertheless, users remained enthusiastic about the potential of the Lujan Center as shown by good attendance at the meeting and by constructive interactions among the users, LANSCE management, and funding-agency representatives.

Recent developments at LANSCE show that the facility is moving rapidly in the right direction to achieve its potential. Perhaps most importantly from the users' point of view, the technical problems at the Lujan Center have been overcome, useful beam was available late last year, and the next run cycle can be expected to be highly productive. It is clear that Laboratory management is strongly committed to the success of LANSCE. Running a multi-disciplinary, multi-sponsor facility such as LANSCE will never be easy, and the reorganized management has a challenging task ahead. The users will have an important role to play in advising the new management of their needs and problems and working with them to find solutions, in addition to the most important role of all—producing top-quality science. As one of these users, I am looking forward to participating in the LANSCE program and am optimistic about its future.

Accelerator Operations and User Program



Comments from the Chair

*Christopher Durning, Columbia University
2000 LANSCE User Group Executive Committee Chair*

My scientific expertise is in academic soft-condensed-matter physics, in particular, the behavior of polymers. Low-angle elastic-scattering methods with neutrons are vital in this field. I came to the Lujan Center first in 1994-1995 to take advantage of SPEAR. My experience was positive enough to encourage my sabbatical at Lujan Center in 1997, which was somewhat of a landmark year for Lujan Center (near 90% availability during the 8-9 month run cycle—wonderful!). I was elected to the LANSCE User Group Executive Committee as Vice-Chair in 1999 and served as Chair in 2000. The committee is charged with enabling communication between external and internal users and LANSCE Division management to optimize the quality of service that the LANSCE facilities provide users. In 2000, we represented about 350-400 members.

I will summarize what, in my view, are the most important recent events that have contributed to the current condition of the LANSCE Division user programs and will give an opinionated prognosis for their future. Before proceeding, it is appropriate to state a generally positive point. During 1999-2000, Roger Pynn directed LANSCE Division with Geoff Greene as the Deputy Director and Joan Thompson as the acting User Program Coordinator. The interaction between the committee and management team was excellent. There was always an efficient, effective line of communication via quarterly on-site meetings and monthly conference calls. Management took the time to educate the committee on the complex issues affecting user programs and consistently solicited frank input from the committee in making key decisions. In short, the LUG Executive Committee worked very well.

What is the current state of the user program? In my view, there are three main components at present...

- (1) neutron scattering and science, using low-energy neutrons at the Lujan Center;
- (2) neutron and nuclear science and technology, using high-energy neutrons at WNR; and
- (3) high-speed, high-resolution imaging facilities using proton radiography.

The last two are working very well. The Lujan Center suffered setbacks during 1998-2000, which hampered the ability of its staff to provide adequate service to the external community and to propagate their own scientific programs. At present, Lujan Center is in the critical state of recovering from these events.

What caused problems for Lujan Center after 1997? I cannot point to a single factor or event. A "number" of significant events occurred during 1998-2000 with particularly adverse impact on Lujan. The main ones were...

- (1) a safety stand-down in response to alarming mesa-wide increases in reportable incidents due to pressed workloads of operations staff,
- (2) a minor safety incident that ultimately necessitated a complete overhaul of the drain system serving the Lujan Center target station and experimental rooms,
- (3) a mercury cleanup in Lujan Center experimental rooms resulting from the legacy of aging instrument-shutter systems,
- (4) a Department of Energy (DOE) imposed need to "invent" the authorization to operate Lujan Center as a nuclear facility after upgrading the Lujan Center target, and
- (5) mesa-wide legacy infrastructure replacements that could no longer be delayed (e.g., radioactive waste pond, cooling towers).

Even Mother Nature contributed grief with a grand forest fire! All of these costly, time-consuming events occurred in a tight fiscal environment. The result for Lujan Center was very limited operation during 1998-2000, hampered instrument development efforts, and loss of key personnel. While not quite the story of Job,

there were clearly unanticipated events falling beyond the scope of any reasonable planning process during this period, which "tied the hands" of Lujan Center staff.

Despite the very bad course of events for Lujan Center during 1998-2000, there is good news to convey. On the heels of 1998-1999, the LUG had its fourth meeting in January 2000, which was very successful (~ 100 attendees), indicating that a high level of user interest still exists despite the recent difficulties for Lujan Center operations. Important legacy infrastructure improvements and regulatory procedures were put in place under Roger Pynn during 1998-2000. While these do not "light up" on the scientific "scoreboard," they clearly ensure smoother operation vital in the near future for Lujan Center. Also under Roger Pynn's watch, three new instruments were all but completed at Lujan Center—the Spectrometer for MAterials Research at Temperature and Stress (SMARTS), the High-Pressure Preferred Orientation (HIPPO) neutron diffractometer, and the Protein Crystallography Station (PCS)—while three others have undergone significant performance upgrades because of new target, shutter, and data-acquisition systems—the Neutron Powder Diffractometer (NPD), SPEAR, and the Low-Q Diffractometer (LQD). The community had the first chance to exploit these upgrades in a relatively short, but very successful run cycle in 2000. In short, despite recent hard times, Lujan Center still has the capability to provide world-class service to the users, which is vital before the Spallation Neutron Source is fully operational and necessary thereafter to satisfy the national need for access to neutron scattering.

This is indeed the essential conclusion of Ward Plummer's Basic Energy Sciences Advisory Committee (BESAC) review of Lujan Center in fall 2000. In fact, Plummer's committee prescribed the most important actions needed to enable Lujan Center to reach this potential. The most important was to redesign the managerial and budgetary link between LANSCE and the DOE Defense Program (DP) system in Washington to better coordinate and optimize the diverse user activities on the mesa.

The Laboratory's response to this challenge has been very positive. Laboratory Director, Dr. John Browne, the LANSCE Division Director prior to Roger Pynn, has become personally involved in reformulating the management and budgetary process for the Division, so as to provide transparent, single-point accountability between LANSCE and DOE/DP in Washington. Through a process involving the LUG Executive Committee, a new LANSCE Division Director, Paul Lisowski, was appointed in January 2001. Importantly, Paul appointed Alan Hurd formerly of Sandia National Laboratories as the new Lujan Center leader. While still finding their feet, our initial impressions of Paul Lisowski and Alan Hurd are very positive. Paul Lisowski produced draft plans for Division management, which, in my view, addresses the main concerns of the Plummer BESAC report. In addition, both Paul Lisowski and Alan Hurd have responded creatively in planning for near-term success of Lujan Center user activities. For example, discretionary resources have been allocated for strategic improvements at Lujan Center that can have a noticeable positive impact on the user program in the next run cycle (e.g., adequate operation of the high-resolution chopper spectrometer, PHAROS, and completion of a new polarized-beam reflectometer, ASTERIX).

The next two years are critical for the Lujan Center. I believe the elements for stable, scientifically successful run cycles for Lujan in 2001 and 2002 are in place and that the user community can and should expect very good quality beam time on a reasonable number of instruments—half of which are world-class. After accomplishing this, LANSCE is positioned very well to develop Lujan Center more aggressively as a complementary "little sister" to the SNS.